

Evaluation of the effect of sports consumption on economic growth in Shaanxi Province Based on VAR model

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Abstract: *Entering the "14th five year plan" period, China's economy has entered a new situation. We should speed up the construction of a new development pattern with the domestic cycle as the main body. In order to give full play to the supporting role of domestic demand on the economy, consumer demand is still the focus. Sports industry has become the focus of attention in various industries, which can promote economic growth by promoting the development of sports industry. Taking Shaanxi Province as an example, based on economic theory, this paper establishes a VAR model of sports consumption on economic growth, empirically studies the relationship between sports consumption and economic growth, and provides suggestions for the formulation of relevant policies.*

Keywords: *Sports consumption, GDP, VAR.*

1. Introduction

Driven by the new round of scientific and technological revolution and industrial reform, China's sports industry has become an important engine of national economic growth. The sports industry plays an irreplaceable role in meeting the people's growing needs for a better life^[1].

On September 4, 2019, the general office of the State Council issued the opinions on promoting national fitness and sports consumption and promoting the high-quality development of the sports industry, emphasizing the need to strengthen the guarantee of elements of the sports industry, stimulate market vitality and consumption enthusiasm, promote the sports industry to become a pillar industry of the national economy, and actively implement the national fitness action, Let regular physical exercise become a way of life^[2]. At present, China's sports industry has changed from the traditional model of sports manufacturing supplies industry to the industrial model of building a diversified structure of sports manufacturing, sports service and sports consumption. Whether it is the process of urban sports or the continuous innovation of sports marketing, the essence behind is the integration and development of sports and other industries. In the future, focusing on people's growing sports consumption demand, the integration and development of sports, science and technology, education, culture and tourism will be further deepened, and more innovative products and formats will be derived. Among all kinds of sports consumption, residents' sports consumption is not only an important driving force to promote the rapid development of sports industry, but also a key force to promote the development of economic construction. The research on Residents' sports consumption can not only understand the current situation and existing problems of residents' sports consumption, but also seek the driving force to promote the upgrading and development of residents' sports consumption from the perspective of economic construction and the development of sports industry.

2. Influence mechanism of sports consumption on economic growth

2.1. Economic interpretation of sports consumption

Demand is the quantity of goods that consumers are willing and able to buy in a certain period and at a certain price level. As far as the demand of the sports industry is concerned, it is the quantity of sports goods that consumers are willing and able to buy in a certain period and at a certain price level. There are immediate consumption and consumption of investment in the future. Among them, instant consumption, such as purchasing relevant sporting goods, watching sports events, etc. In terms of

investment in the future, with the continuous improvement of living standards, people have attached great importance to the health capital formed by physical exercise, which can improve work efficiency and quality of life, and then obtain higher income. People are more willing to invest more capital in physical exercise activities. This reflects the concept of "induced demand" in economics. The demand of enterprises for production factors is derived from the needs of consumers for the products produced by changing factors.

2.2. Economic growth theory

Keynes put forward the economic growth theory that economic growth depends on the employment rate, and the employment rate depends on the level of residents' income. In his consumption theory, he believes that consumption will increase with the increase of income. Then, some scholars developed Keynes's economic growth theory, but they all believe that investment, government intervention, consumer demand and national savings are important factors to promote economic growth.

Sports consumption drives the rise of sports industry. At present, sports industry has become a new breakthrough to promote labor employment. From the perspective of industrial economics, there are many upstream and downstream industries corresponding to the sports industry, which provides a lot of growth space for promoting social employment. With the increase of employment rate, it is bound to promote regional economic growth^[3].

3. Current situation and characteristics of sports consumption of urban residents in Shaanxi Province

3.1. Current situation of sports consumption in Shaanxi Province

3.1.1. Consumption level

The development of sports consumption stems from the continuous growth of residents' income and the continuous optimization of consumption level and structure. In 2021, the per capita disposable income of urban residents in Shaanxi Province was 31052 yuan, an increase of 8.5%, with an average increase of 6.5% in 2020 and 2021.

From 2011 to 2021, with the increase of the province's total economy, the GDP index continues to rise and the residents' living standards continue to improve, which promotes the continuous development and upgrading of the sports industry. The residents' sports consumption tendency in our province shows an obvious upward trend (see Table 1). From Table 1, it can be seen that the residents of our province have a positive attitude towards sports consumption.

Table 1: Statistical table of sports consumption level of urban residents in Shaanxi Province

Consumption	Household consumption level (yuan)	Per capita consumption level (yuan)	Overall consumption level of urban residents in Shaanxi Province (100 million yuan)
Participatory sports consumption	400.14	150.77	14.80
Ornamental sports consumption	150.2	50.78	5.66

3.1.2. Consumption structure

The sports consumption of urban community residents in Shaanxi Province is divided into five categories: sports material consumption, sports information consumption, outdoor sports activities consumption, sports labor consumption and sports collection consumption. With the abundance of leisure time and capital, our province is gradually changing from the industry of durable consumer goods to the tertiary industry of service-oriented consumer goods. People have reduced the consumption of sports clothing and equipment, and there is an increasing demand for sports fitness and entertainment, sports competition performance and the use of sports venues.

3.2. Characteristics of sports consumption in Shaanxi Province

The daily consumption of urban residents in Shaanxi Province is mainly concentrated in clothing, food, housing, transportation, education and medical care. The proportion of sports consumption in the

daily consumption expenditure of urban residents in Shaanxi Province is still at a low level.

Among the sports consumption items of urban residents in Shaanxi Province, the main sports consumption items of urban residents are to buy sports clothes, shoes, hats, watch sports competitions and participate in exercise in charged fitness and entertainment places. From the development trend of sports consumption, these belong to the basic physical exercise demand, and the overall consumption still belongs to the transition stage from physical consumption to participatory and ornamental consumption.

4. Economic growth effect of sports consumption of urban residents in Shaanxi Province

This part analyzes the economic growth effect of urban residents' sports consumption by establishing the VAR model of total sports consumption and economic growth. This paper selects the relevant data from 2013 to 2021 (including GDP, entertainment and sports consumption, etc.) through empirical test and analysis, so as to more accurately prove the scientificity of the total sports consumption and economic growth theory of urban residents in our province^[4].

4.1. Data selection and description

Firstly, this paper selects the cultural and sports consumption of urban residents in the statistical yearbook of Shaanxi Province from 2011 to 2021.

Data processing. Assuming that the sports consumption of residents in all cities in the province accounts for the same proportion of the overall entertainment and sports consumption, the sports consumption of urban residents is the data of entertainment and sports consumption of urban residents multiplied by the same proportion constant, and the coefficients in front of each variable are the same and can be cut off, then it can be considered that the entertainment and sports consumption of urban residents is the sports consumption of urban residents. Since the statistical yearbook of Shaanxi Province over the years gives the "per capita sports consumption of urban residents", this paper studies the "total sports consumption of urban residents", so this paper also selects the total annual urban population of Shaanxi Province in the Shaanxi population Yearbook (2013-2021) and multiplies it with the per capita Sports consumption of urban residents to make data processing. Get the total sports consumption of urban residents in our province. The total sports consumption of urban residents is abbreviated as TSC.

As the explanatory variable of the model, the provincial GDP is abbreviated as GDP. As the explanatory variable of the model, the influence of other exogenous variables is not considered for the time being.

In order to eliminate the possible heteroscedasticity of time series data, the natural logarithm of TSC and GDP is taken for analysis in the subsequent empirical analysis.

4.2. Descriptive analysis of data

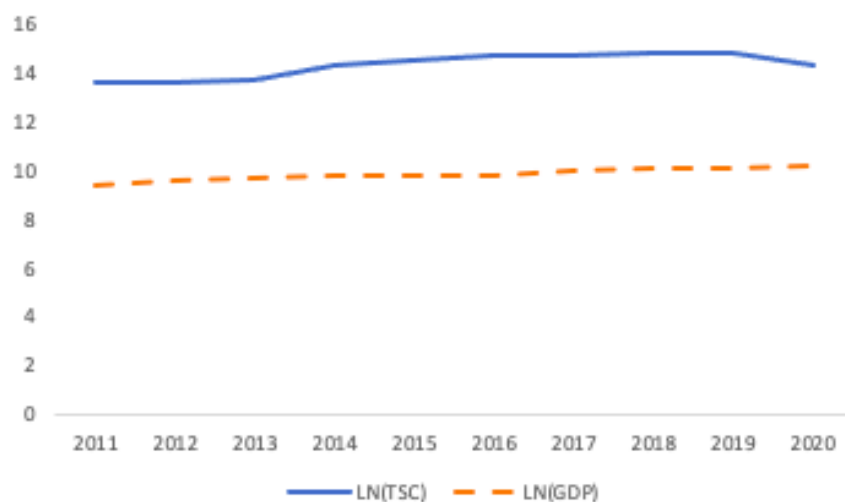


Figure 1 Change trend

The descriptive statistical results of GDP and total sports consumption of urban residents in the province are shown in table X. It can be seen from Table 2 that the correlation coefficient between the provincial GDP and the total sports consumption of urban residents is large. It can be seen from the data of 2011-2021 that the change trend is basically the same, as shown in Figure 1. In the follow-up, a model will be established to make a specific analysis of the quantitative relationship between the two.

Table 2: Describes the analysis

variable	mean	median	Maximum	minimum	standard deviation	correlation coefficient	
						LN(GDP)	LN(TSC)
LN(GDP)	9.85	9.82	10.17	9.43	0.25	1	0.79
LN(TSC)	14.34	14.46	14.84	13.63	0.50	0.79	1

4.3. Construction of VAR model of sports consumption

This paper preliminarily establishes a simple VAR model (see formula 4-2 and formula 4-3). Take the first-order difference for lnGDP and lntsc, which are expressed by dlngdp and dlnrsc respectively. On this basis, we take the time series lnGDP .And lntsc to establish var (2) model as follows:

$$LnGDP_t = \sum_{t=1}^q \alpha_1 \Delta LnGDP_{t-j} + \beta_1 \Delta LnTSC_{t-1} + \epsilon_{1,t} \tag{1}$$

$$LnGDP_t = \sum_{t=1}^q \alpha_1 \Delta LnGDP_{t-j} + \beta_1 \Delta LnTSC_{t-1} + \epsilon_{1,t} \tag{2}$$

4.4. Model analysis

4.4.1. Unit root inspection

Since the VAR model requires all variables in the system to be stable, the unit root test is performed on the variables first. ADF test is used here. The results are shown in Table3. At the significance level of 5%, there is a cointegration relationship between lnGDP initial order single integration and lntsc first order single integration.

Table 3: Unit root test

variable	Inspection type	ADF test value	P value	conclusion
LnGDP	(c,t,3)	0.56524	0.99	Nonstationary
LnTSC	(c,t,0)	-6.2508	0.01	stable
ΔLnTSC	(c,t,0)	-5.2478	0.01	stable

4.4.2. Cointegration relationship test

Establish the regression equation of first-order single integer sequence lntsc and lnGDP:

$$LnGDP = \alpha_1 LnTSC + \epsilon \tag{3}$$

Next, we test the stationarity of the residual sequence, and there is a cointegration relationship.

In order to investigate whether the relationship between sports consumption and economic growth of urban residents is stable for a long time, the data are tested by cointegration. LnGDP and lntsc assume that there is a deterministic trend in the data, there is an outcome term in the cointegration equation, and the lag period is 2 Construct the standardized cointegration equation as:

$$LnGDP = 0.8811LnTSC + 9.5908 \tag{4}$$

5. Future trends

Through the establishment of VAR model for the two variables of total sports consumption and GDP of urban residents in Shaanxi Province, through the estimation and cointegration analysis of VAR model, it can be concluded that there is an equilibrium relationship between sports consumption of urban residents and economic growth, and it plays a long-term and stable role in promoting economic growth^[5].

5.1. The sports industry presents the posture of "sports +" and promotes the massive growth of sports consumption

While developing the sports industry, we should break down technical barriers and strengthen industrial integration, so as to make the sports economy an indispensable field in the social and economic system. Throughout the countries with prosperous sports industry in the world, the sports industry presents the posture of "sports +" and develops in linkage with other industries. According to the calculation of American economists, among the departments existing in the American economic structure, the relevance of the sports industry ranks eighth. Therefore, the sports industry in our province should not only respond to the general trend of industrial integration, but also make full use of the influence of sports to promote the trend of economic and industrial integration in our province.

5.2. Talents lead the high-quality development of sports industry

The key to the growth of sports consumption lies in the high-quality development of sports industry through specialization and industrial integration, but any industry cannot achieve high-quality development without the support of talents. Therefore, talents are the necessary driving force to promote the growth of sports consumption and promote the high-quality development of sports industry. Cultivating high-quality sports talents is also known as a direction of the reform of new majors in Colleges and universities. Analyze the new positions brought by sports + in the industry. This can make the development of sports industry in our province always maintain vitality and keep pace with the times, so as to further meet the increasing sports consumption demand of the broad masses of the people.

6. Conclusion

In many foreign developed countries, the sports industry is booming and residents' sports consumption is high, which is complementary to the local economic development level. At present, the economic development of Shaanxi Province and the consumption level of residents' daily life are not high, which hinders the development of local sports industry. Therefore, Shaanxi Province must combine the economic situation and residents' consumption level of the province, put forward sports that can adapt to the residents of the province and can consume, and then develop the sports industry of the province, rather than relying solely on the pulling effect of investment. Therefore, a relatively long-term and stable economic policy is the first choice, through the policy means of stimulating sports consumption, Promote the sports consumption of urban residents in China to play a lasting driving role in national economic growth, so as to expand the demand of sports consumption of urban residents in our province and promote the healthy development of provincial and national economy.

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